Author: **Subject: Ammonium perchlorate without DIY anodes?**

greenlight
International Hazard
posted on 31-8-2015 at 08:18

I was going to start with Sodium chloride and run all the way to perchlorate
Power supply is 5 volt 40 amp.
Hopefully I can still get one or two out of a Pt anode.

Posts: 620
Registered: 3-11-2014
Member Is Offline

Mood: Energetic

The only use for an atomic bomb is to keep somebody else from using one.
George Wald

PROFILE FIND

ecos
National Hazard
posted on 31-8-2015 at 11:14

I found some MMO anodes that can support till 300-250 mA/cm2
The size of the annodes where 2"x6"..... they can support max 21-18A

Talking about 40A is madness for small anodes.
Safe side to be around 10A.

I am not expert but i started learning about chlorate/perchlorates

Posts: 464
Registered: 6-3-2014
Member Is Offline

Mood: Learning !

PROFILE FIND

greenlight
International Hazard
posted on 31-8-2015 at 19:08

Alan yates has pictures on his site of a very small perchlorate cell and the power supply is over 50 amps. Registers 56 amp on his meter in the pic.
He says the major problem is boiling of the electrolyte solution and of course abuse of the electrodes but very fast conversion.

I was going to use a 6.5 volt power supply but was unable to find one online so I see how the 5 V 40 amp turns out.
I want to do a 1-1.5 L cell in which you can place the electrodes apart more to control the heat or a water bath.
Still undecided on the anode.

Posts: 620
Registered: 3-11-2014
Member Is Offline

Mood: Energetic

The only use for an atomic bomb is to keep somebody else from using one.
George Wald

PROFILE FIND

nux vomica
National Hazard
posted on 31-8-2015 at 22:30

This is my cell I used years ago its made from pvc plumbing fittings and has a capacity of 800mls the mmo anode is 5×7.5 cms and I ran it at 20 amps or 266ma per cm2.
Perchlorate is not so bad on your anode I found just dont try barium chlorate that's what damaged my cells anode
Nuxy

Posts: 265
Registered: 18-7-2013
Member Is Offline

Mood: No Mood

PROFILE FIND

ecos
National Hazard
★★★★

posted on 31-8-2015 at 23:56

I read a lot about the anodes, for MMO :

Posts: 464
Registered: 6-3-2014
Member Is Offline

Mood: Learning !

> **Quote:**
>
> MMO (Mixed Metal Oxide (Trade Name: DSA (Dimensionally Stable Anode)), usually made from the Oxides of Noble Metals, Ru and Ir, on a Titanium (a Valve metal) substrate. Used by ALL Chlorate Industrial setup's nowadays. Not recommended to be used in electrolytes where the Chloride level has been let drop very low (30g/l absolute minimum), better to keep at or above 50g/l Chloride. They can be used at relatively high current densities, 300mA per square cm, around 200mA per square cm could be considered a working value. There are a range of MMO types on the market. In corrosion prevention applications they are used in very low Chloride concentrations at low current density. They are also used in swimming pool Chlorination systems.
> MMO will not make Perchlorate AFAIK though some types (Pt Oxide based) may be capable of making Perchlorate.
> MMO should not be operated at high temperatures. Pool Chlorination Anodes are mostly MMO Anodes though sometimes they are Pt metal based. Do not use Fluoride additive with MMO

I don't understand why MMO won't make perchlorate?!

PROFILE FIND

nux vomica
National Hazard
★★★★

posted on 1-9-2015 at 00:30

Posts: 265
Registered: 18-7-2013
Member Is Offline

Mood: No Mood

> **Quote:** **Originally posted by ecos**
>
> I read a lot about the anodes, for MMO :
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> >
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>
> I don't understand why MMO won't make perchlorate?!

You can its just harder on the anode than making chlorates I calculated when most of the sodium chlorate had been converted into sodium perchlorate then destroyed the leftover chlorate then added potassium chloride to form the potassium perchlorate nux.

PROFILE FIND

greenlight
International Hazard
★★★★★

posted on 1-9-2015 at 01:17

Posts: 620
Registered: 3-11-2014
Member Is Offline

Mood: Energetic

@ Nux, I always thought you needed a Pt anode to make perchlorate.
How did you calculate when it was finished, using methylene blue?
Did you do a test on the final product to make sure it was Potassium perchlorate?

The only use for an atomic bomb is to keep somebody else from using one.
George Wald

PROFILE FIND

nux vomica
National Hazard
★★★★

posted on 1-9-2015 at 01:55

Posts: 265
Registered: 18-7-2013
Member Is Offline

Mood: No Mood

> **Quote:** Originally posted by greenlight
>
> @ Nux, I always thought you needed a Pt anode to make perchlorate.
> How did you calculate when it was finished, using methylene blue?
> Did you do a test on the final product to make sure it was Potassium perchlorate?

It was over 10 years ago but yes I used the methyline blue test and I think the amps had dropped a lot so it wasn't worth running the cell anymore , I used the matchbox test to see if there was chlorate left , put a small amount on the box striker and rub it across it like striking a match, perchlorate wont react, just dont burned your finger though:D
Its not as efficient as platinum but you can stil get perchlorate from a mmo anode.

Edit tried a little perchlorate solution with methyline blue purple precipitate straight away filter paper is wet so color not as good as dry paper .

[Edited on 1-9-2015 by nux vomica]

PROFILE FIND

greenlight
International Hazard
★★★★★

posted on 1-9-2015 at 02:41

Posts: 620
Registered: 3-11-2014
Member Is Offline

Mood: Energetic

That's a good idea for a quick test using a matchbox as well as using the methylene blue.
I think I will still use the platinum coated anode with titanium cathode and see how long they actually last.

How big was the cell you used and how long did it take to go all the way to perchlorate?
Also how many volts was the cell?

Cheers

[Edited on 1-9-2015 by greenlight]

The only use for an atomic bomb is to keep somebody else from using one.
George Wald

PROFILE FIND

nux vomica
National Hazard
posted on 1-9-2015 at 03:20

Posts: 265
Registered: 18-7-2013
Member Is Offline

Mood: No Mood

> **Quote: Originally posted by greenlight**
>
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>
> How big was the cell you used and how long did it take to go all the way to perchlorate?
> Also how many volts was the cell?
>
> Cheers

5 volt and 800mls cannot remember exactly but I think it was over 5 days run time , I bought a piece of mmo 300×300 so I wasnt worried about damaging the anode but yes platinum would be better nux.

PROFILE FIND

ecos
National Hazard
posted on 1-9-2015 at 03:53

Posts: 464
Registered: 6-3-2014
Member Is Offline

Mood: Learning !

I would like to buy the anode for my tests.

i found this link for MMO anode(Iridium/Ruthenium Oxide) and Titanium cathode : http://store.theamateurchemist.com/mmo-solid-plate-anode-tit...

they write in the description :

> **Quote:**
>
> These are great for a variety of uses: all kinds of electrolysis, chlorinators, **chlorate and perchlorate cells**, ionizers, precious metals plating, etc.. These are quality electrodes and will last for a long time if they aren't damaged (eg - send too much current through them). The max anode current density for mmo is around 250 - 300 mA/cm^2

do you think the plates are a good option or they would corrode easily ?

PROFILE FIND

greenlight
International Hazard
posted on 1-9-2015 at 04:13

Posts: 620
Registered: 3-11-2014
Member Is Offline

Mood: Energetic

Thanks Nux, and Ecos what are you trying to make with the electrodes you linked?
I have brought the same electrodes from the page you linked twice for a chlorate cell one time being for spares.
They work very well, I have done a few batches of Potassium chlorate with them and they show no signs of wear at all.
I'm going to try his platinum coated electrode in my perchlorate cell.
You can also get them with Titanium strips welded on as an extra option if needed, my latest ones are in the pic below.

[Edited on 1-9-2015 by greenlight]

The only use for an atomic bomb is to keep somebody else from using one.
George Wald

PROFILE FIND

ecos
posted on 1-9-2015 at 04:19

National Hazard

Yes, I am planning to ask for Titanium strips to be welded.

Posts: 464
Registered: 6-3-2014
Member Is Offline

I am planning for KClO4, do you think the would be efficient or should i stick to Pt ? they state in the Quote above they can be used for both chlorate and perchlorate cells.

Mood: Learning !

PROFILE FIND

greenlight posted on 1-9-2015 at 04:23

International Hazard

I think it would take a lot longer using MMO as the anode, and would probably end up wearing it out fast as well.
The best anode material is pure platinum or lead dioxide but they are both expensive.
If your only trying to make Potassium perchlorate personally i would go the platinum coated but it's up to you. Nux got KCl04 with MMO anode as stated above.
I am about to put the order through for a couple of his platinum coated electrodes now, only thing I'm worried about is excessive wear

Posts: 620
Registered: 3-11-2014
Member Is Offline

Mood: Energetic

The only use for an atomic bomb is to keep somebody else from using one.
George Wald

PROFILE FIND

greenlight posted on 1-9-2015 at 04:40

International Hazard

Hang on, the Platinum coated electrode from the Ecos linked only has a Pt coating 1 micrometer thick.
This one from ebay would probably be better if buying a Pt coated electrode as it is 2.5 micrometers thick:

Posts: 620
Registered: 3-11-2014
Member Is Offline

http://www.ebay.com/itm/PLATINIZED-TITANIUM-ANODE-PLATING-AN...

Mood: Energetic

The only use for an atomic bomb is to keep somebody else from using one.
George Wald

PROFILE FIND

ecos posted on 1-9-2015 at 06:21

National Hazard

thanks Greenlight for the info.

Posts: 464
Registered: 6-3-2014
Member Is Offline

2.5 um is better than 1u and the price is just $6 difference !

I will buy it. but what should i do for the cathode, should i buy SS or titanium electrode?

Mood: Learning !

PROFILE FIND

greenlight posted on 1-9-2015 at 07:07

International Hazard

Yes, it seems like the better option.
As for the cathode, I am going to buy one of the single Titanium electrodes from the site you linked before as they are quite cheap but either option is okay to use as far as I know.

Posts: 620
Registered: 3-11-2014
Member Is Offline

Mood: Energetic

The only use for an atomic bomb is to keep somebody else from using one.
George Wald

PROFILE FIND

franklyn posted on 1-9-2015 at 08:34

International Hazard

Has the use of semiconducting materials such as doped silicon carbide been investigated for suitability in electrodes ?

Posts: 3014
Registered: 30-5-2006
Location: Da Big Apple
Member Is Offline

Mood: No Mood

Perovskite electrode cells have also been investigated , lightly discussed in this brief _
Anodes for Electrochemical Processes
www.isca.in/rjcs/Archives/vol3/i6/From%20Editorial%20Desk.pd...
I mentioned this once before and **damn2** thought the resistance would be too high and therefore exhibit poor efficiency.
http://www.sciencemadness.org/talk/viewthread.php?tid=8592&a...
Related threads _
http://www.sciencemadness.org/talk/viewthread.php?tid=8592
http://www.sciencemadness.org/talk/viewthread.php?tid=9783

Operating a water electrolysis cell under pressure significantly improves performance. Has this been looked into regarding Chlorate/Perchlorate production ?
A bubble curtain model applied in chlorate electrolysis
http://publications.lib.chalmers.se/records/fulltext/162957....

Another notion I recall mentioned in some patents is circulating the electrolyte in the cell with the intent of improving the performance.
Ultrasonically agitating the electrodes with a Piezoelectric transducer does not seem to have been considered anywhere.

.

Techniques to Disrupt, Deviate and Seize Control of an Internet Forum In case you wonder W T F ! is going on here ?
www.zerohedge.com/contributed/2012-10-28/cointelpro-techniques-dilution-misdirection-and-control-internet-forum www.washingtonsblog.com/2012/08/the-15-rules-of-internet-disinformation.html

PROFILE FIND

ecos
National Hazard

posted on 1-9-2015 at 23:41

Posts: 464
Registered: 6-3-2014
Member Is Offline

Mood: Learning !

I think we have a lot of factors affecting the efficiency of chlorate and perchlorate electrolysis :
1- electrode material -- platinum is the best
2- PH -- should be around 6.8
3- Temperature
4- ultraviolet rays affect the synthesis.
5- circulation of the electrolyte
6- current density
7- Pressure
..... etc !

wow this amaze me a lot. I thought the process is very easy but now I realized how many details we need to care about to have efficient cell

PROFILE FIND

ecos
National Hazard

posted on 1-9-2015 at 23:55

Posts: 464
Registered: 6-3-2014
Member Is Offline

Mood: Learning !

> **Quote:** Originally posted by nux vomica
>
> > **Quote:** Originally posted by ecos
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I don't understand why MMO won't make perchlorate?!

You can its just **harder** on the anode than making chlorates I calculated when most of the sodium chlorate had been converted into sodium perchlorate then destroyed the leftover chlorate then added potassium chloride to form the potassium perchlorate nux.

would you please explain what you mean by "Harder"? the factor here is time,current ,....?

PROFILE FIND

nux vomica
National Hazard
★★★★

posted on 2-9-2015 at 00:54

Posts: 265
Registered: 18-7-2013
Member Is Offline

Mood: No Mood

Quote: Originally posted by ecos

Quote: Originally posted by nux vomica

Quote: Originally posted by ecos

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would you please explain what you mean by "Harder"? the factor here is time,current ,....?

Harder as in the wear to the anode will be faster compared to if you only made chlorate in the cell.

PROFILE FIND

ecos
National Hazard

posted on 2-9-2015 at 03:25

Thanks Nux,

Posts: 464
Registered: 6-3-2014
Member Is Offline

Let me ask , chlorate and perchlorate are synthesised with the same setup but different run-time duration.

so we can find perchlorate while making chlorate only ! how this is controlled to avoid wear of anode?

Mood: Learning !

PROFILE FIND

nux vomica
National Hazard

posted on 2-9-2015 at 04:33

Posts: 265
Registered: 18-7-2013
Member Is Offline

Mood: No Mood

> **Quote: Originally posted by ecos**
>
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>
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>
> so we can find perchlorate while making chlorate only ! how this is controlled to avoid wear of anode?

You can use potassium chloride as your cell electrolyte, and run it until you see a reasonable amount of chlorate crystals form, then let the cell cool so the rest of the chlorate separates, filter the chlorate then add a calculated amount of potassium chloride to refresh the cell and start the run again.

Also you need to keep the cell temperature controlled so it doesn't get to hot and make sure the anode is fully submerged in the cell liquid to stop corrosion of the anode.

[Edited on 2-9-2015 by nux vomica]

PROFILE FIND

ecos
National Hazard

posted on 2-9-2015 at 05:22

regarding the erode of the anode :

Posts: 464
Registered: 6-3-2014
Member Is Offline

Mood: Learning !

> **Quote:**
>
> Anode current densities used vary widely. They range from 100mA/square cm to 700mA/square cm. Use about 300mA/square cm. Pt will increasingly erode if used in a Chlorate cell with a low concentration of Chloride. Keep above 80 grams per litre Chloride. Pt will also increasingly erode if used in a Perchlorate cell if the concentration of Chlorate is low, though the extra erosion appears to be little.

I found this part on Link

this means when the cell starts running the chloride level will decrease because chlorate is formed and participated in the bottom of the cell.

keep the cell running for long time would cause the anode to erode more quickly ! , this also means we need to stop the cell before most of the chloride is transformed , threshold should be 80 grams per litre Chloride.

if i am correct in my understanding , how could we calculate the run-time of the cell ?!

PROFILE FIND

greenlight
International Hazard

posted on 2-9-2015 at 05:45

Yes, like Nux said, just stop before the chloride content gets too low, filter and refill the cell with sat. Nacl solution and start again. Its easier than perc would be because you can see the Potassium chlorate precipitating on the bottom. In the perc cell I think you have to rely on the methylene blue and boiling the residual chlorate.

Posts: 620
Registered: 3-11-2014
Member Is Offline

My chlorate cell is 900ml volume. I let it run for about 100 hours and chilled it in the fridge before filtering. By this time, there was a thick layer in the bottom. Yield was 365g the first time and 300g the second.

Mood:
Energetic

[Edited on 2-9-2015 by greenlight]

The only use for an atomic bomb is to keep somebody else from using one.
George Wald

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Ammonium perchlorate without DIY anodes?